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Dear Alan,

Enclosed are the Agencies' comments on the Draft Smoky Canyon Mine RI/FS Site-Specific Human Health Risk Assessment (HHRA) dated December 2014. The Draft HHRA is a Deliverable under the 2009 Administrative Agreement and Order on Consent/Consent Order (ASAOC) for Performance of Remedial Investigation and Feasibility Study under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

As required under the ASAOC, Appendix 1, please provide Simplot's responses to the enclosed Agency comments on or before 21 calendar days from receipt of this letter.

You may contact me at 208-313-4469 with any questions you may have regarding this matter.

Sincerely,

MARY KAUFFMAN
Remedial Project Manager

Enclosure

cc: Monty Johnson, Simplot, Pocatello
Burl Ackerman, Simplot, Boise
Sandi Fisher, FWS, Pocatello
Colleen O'Hara-Epperly, BLM, Pocatello
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Agency Comments
Draft Smoky Canyon Mine RI/FS Site-Specific Human Health Risk Assessment, dated December 2014

July 6, 2015

Mary E. Kauffman
USFS Remedial Project Manager, Smoky Canyon Mine

General Comments

1) During the June 24, 2015 conference call between Simplot, their contractor Formation Environmental, the Forest Service and Support Agencies, to discuss Preliminary Draft Agency comments on the Draft HHRA, Simplot asked for clarification on the timing of inclusion of toxicity values updates in risk assessments under CERCLA. Some of the comments presented below, submitted to Simplot as Preliminary Draft Comments in April 2015, identify toxicity values that were updated in the first part of 2014. These updated values were not included in the Draft HHRA received December 19, 2015. The Agencies believe that updates/changes in risk scenario inputs and toxicity values (and any other inputs into risk assessments not specifically list here) should be considered up to submittal of the Draft Final and even the Final depending on the specific parameter being updated and its potential effect on the outcome of the risk assessment. At the very least, updates to parameters/values that could have a potential minor to moderate effect should be disclosed and discussed in the uncertainty section of the RA and the appropriate source referenced for the Draft Final. Should an update be released between the Draft Final and Final that could have significant effect on the outcome of the risk assessment conclusions, the Agencies reserve the authority to require said updates be included in the Final risk assessment.

2) A description was not found anywhere in the HHRA to whether vegetation tissue data were for washed or unwashed vegetation. For sites where washed vegetation tissue are directly measured or modeled tissue data are used, a mass loading factor (MLF) has been used to estimate what's on a plant. Other mines have used the MLF to address the potential exposure to unwashed vegetation. It's important to evaluated the material on the plants as not all users wash vegetation prior to consumptions (e.g., cattle, elk, Native Americans, etc.). These exposures may have been captured through other means (e.g., soil ingestion rates), however clarification is necessary to understand how these exposures were captured in the risk estimates. Please revise accordingly.

3) Meat and produce ingestion rates should not be reduced for cooking losses. This was not specifically addressed in the current document. Please add a brief statement that either ingestion rates were not reduced for cooking losses, or revise the ingestion rates accordingly.

4) Some of the EPA recommended exposure factors have changed since the planning documents for Smoky. Please revise and update using the recently revised CERCLA standard default exposure parameters for the residential scenario, http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/whatsnew/EFH_changes_table_memo_2014.pdf.

Specific Comments

5) **Page 13, Section 3.2, 1st paragraph, last sentence:** In the screening evaluation, COIs were not identified as COPCs to be carried forward for quantitative evaluations if screening levels were not available. This is inappropriate and either other relevant screening levels (most of which had screening values in the WP and in the Screening Levels, Exposure Factors, and Toxicity Factors for Smoky Canyon Mine Site-Specific Human Health Risk Assessment memorandum) should be identified or these should be considered as COPCs and evaluated in the quantitative evaluation. RfDs and other toxicity values are available for most COIs to evaluate the risk posed by these constituents. Please revise accordingly.

6) **Page 13, Section 3.2, 5th paragraph, 3rd sentence:** It is stated that exposure to the radiological activity of uranium and its daughter products were evaluated in the hypothetical residential scenario only. It has generally been understood that radiological risk to residential receptors would be greater than that to other receptors. However, a recent analysis at the Ballard Mine indicates that other receptors can also have considerable risk from exposure to radionuclides. For example, based on Ballard exposure parameters and the Smoky Canyon uranium exposure point concentrations (from Table 4-2) of 3.41 mg/kg for residential receptors and 16.6 mg/kg for all other receptors, the following risk levels can be estimated based on Ra-226+D exposure:
Resident : 2E-04
Camper/hiker: 3E-05
Seasonal rancher: 1E-04
Hunter: 4E-05
Native American: 2E-03
This is just an example, and it does not take into account possible differences in exposure assumptions used at the sites, but it indicates that radiological exposure to receptors other than the hypothetical future resident should be evaluated.

7) **Page 13, Section 3.2, 5th paragraph, last sentence:** The U-238+D residential soil PRG is presented as 0.696 pCi/g or, expressed as a concentration, 2.07 mg/kg. However, the recently revised U-238+D residential soil PRGs are 4.96E-02 pCi/g or 1.48E-01 mg/kg. Similarly, the tap water PRGs for U-238+D are presented as 0.607 pCi/L or 0.0081 mg/kg. The current U-238+D tap water PRGs are 3.85E-01 pCi/L and 1.15E-03 mg/L. For the radiological risk analysis, please use the most recently updated version of the radionuclide PRG calculator: http://epa-prgs.ornl.gov/radionuclides/

8) **Page 16, Section 3.2.2, 2nd to last paragraph:** It is stated that boron, molybdenum and silver do not have SLVs for surface water and ground water, so they were not carried through the risk assessment, and were evaluated qualitatively instead. All of these chemicals have RfDs, and tap water RSLs. Therefore, they should be evaluated quantitatively in these media.

9) **Page 16, Section 3.2.2, last paragraph:** As noted in the *Area Wide Risk Management Plan* (IDEQ 2004), there is an elevated risk to human health from radium-226 when a residential scenario is considered. Other human exposure scenarios (e.g., recreational users, workers, etc.) are expected to have significantly lower risk, however were not evaluated during the area wide studies. The risks associated with uranium, and its radioactive daughter products, was identified as a data gap during the Smoky Canyon risk assessment planning phases. Specifically, the Agencies were concerned that since U-238 constitutes the majority of naturally occurring uranium, radionuclides in the U-238 decay chain such as radium-226 may be associated with unacceptable radiogenic risk under certain exposure scenarios. As planned, the Smoky Canyon

HHRA used the mass concentration of uranium to conservatively estimate activity concentration of daughter products such as Ra-226. Exceedances for several radiogenic compounds were identified in Section 3.2.2, however the extent of the exceedances are not described in the text. Screening tables in Appendix D indicate that risks for the hypothetical scenarios on private lands could be several orders of magnitude above the acceptable risk range. Appendix D, Table D.13 indicated these are considered COPCs and further quantitative evaluation would occur with results to be included in the risk characterization. It does not appear that any further evaluation was conducted, nor are the potential risks associated with radiogenic exposures described in Risk Characterization (Section 6) or the Conclusions (Section 7).

Furthermore, considering the level of the exceedances for the risks associated with exposures to radionuclides in hypothetical future residents on private lands, it's important for the HHRA to provide radiological risks estimates for other potential site users that could be exposed to radionuclides. This information is necessary to determine whether remedial actions would be necessary to protect site users other than residents. The Agencies will require that an evaluation for exposures to radionuclides be conducted that addresses the potential risks to each of the representative human receptors. To accomplish this, the Agencies suggest estimating risk using available risk calculator tools for workers and recreators, such as provided by Oak Ridge National Laboratory at: http://rais.ornl.gov/cgi-bin/prg/RISK_search?select=rad.

10) **Page 17, Section 3.2.2, 1st paragraph:** The radionuclides that exceeded screening levels are presented here. There is no further discussion of radiological risk in the exposure assessment, risk characterization, or conclusions sections. It appears that risk from exposure to radionuclides was not estimated. The risk assessment cannot be considered complete without this information. Please address radiological risk in the risk assessment.

11) **Page 18, Section 4.0, 2nd paragraph, last sentence:** The text states "Supplemental information, including deviations from these planning documents and Site-use questionnaires, are presented in Appendix A." Please revise to provide a summary here of any deviations from the cited planning documents in the HHBRA.

12) **Page 19, Section 4.3, last paragraph:** The statement "Current human use of the Site is limited" requires additional support. Interviews (summarized in Appendix A) indicate that currently recreational use and workers conducting environmental monitoring occurs regularly.

13) **Page 20, Section 4.3, 2nd bullet:** Interviews (summarized in Appendix A) indicate that recreational users fish in the Hoopes Spring, Sage Creek and Crow Creek. Therefore, fishing at the Hoopes Spring area should also be added to the discussion in this section.

14) **Page 22, Section 4.4, 2nd paragraph, last sentence:** Please provide a slightly more detailed summary here for the average readers' understanding so they don't have to find the information in the appendix regarding changes that were made subsequent to the Agency-approved planning documents.

15) **Page 23, Section 4.5, 2nd paragraph:** With the exception of the hypothetical resident, EPCs were calculated on a Site-wide basis. Although this may be acceptable for the Site-specific scenarios at Smoky Canyon, the report needs to provide additional information here that supports the decision to group all data over such a large area.

16) **Page 24, Section 4.5, 2nd paragraph:** The approach indicates that the chemical specific transfer coefficients for estimating tissue concentrations from feed concentrations were as reported in the Air Toxics Hot Spots Program Risk Assessment Guidelines: Technical Support Document for Exposure Assessment and Stochastic Analysis (Cal-EPA, 2012). This is partially true since many were also taken from Baes et al, 1984, so both should be mentioned. Cal-EPA represents a newer guidance document that underwent significant peer review and should be preferentially utilized, which is consistent with the footnotes in Appendix F, Table F.6.1. However, not all values from Cal-EPA were used (e.g., selenium). The 0.04 transfer coefficient from Cal-EPA needs to be used instead of the 0.015 value from Baes et al.

17) **Page 24, Section 4.5, 2nd paragraph, 2nd sentence:** It is not clear that the assumption of equal concentrations of COPCs in beef muscle and organs is appropriate, at least for selenium, based on work that has been done on selenium in elk tissue (ATSDR, 2006), in which liver was found to have considerably higher concentrations than muscle tissue. Additionally, elk tissue collected from animals harvested in the SE Idaho phosphate mining area and published in 2000 indicated that selenium and cadmium levels were often 10 times higher than measured in muscle tissue. Please clarify and revise as needed.

18) **Page 24, Section 4.5, 2nd and 3rd paragraphs:** Estimates of beef and wild game tissue EPCs requires several modeling steps and the report does not provide sufficient detail describing the equations and assumptions involved. These paragraphs indicate vegetation EPCs and chemical specific transfer coefficients for intake to tissues are used, however there is no mention of the other intake sources (i.e., water consumption and incidental ingestion of soil). It would be useful to provide the equations for modeling cattle and game tissue EPCs.

19) **Page 24, Section 4.5, 3rd paragraph:** Estimates for wild game tissue EPCs are described, however it is not apparent what receptor was used as a representative for wild game. Is it grouse, elk, deer, moose, or cattle as intake per kilogram body weight can differ significantly? Based on Appendix F Table F.7.1, it appears that cattle were used as a surrogate, which warrants justification within the report.

20) **Page 25, Section 3.1.1, 1st paragraph:** The text states that the site-wide exposure point concentrations in abiotic and biotic exposure media were represented by the 95 percent upper confidence limit on the mean. Initially, this does not make sense in the context of disconnected fisheries such as one stream system is more affected by elevated COPC concentrations than another, but disconnected, stream system within the Site. Examples could be where water and sediment COPC concentrations from Smoky Creek are combined in the same dataset with Lower Sage Creek to develop a mean exposure point concentration. It is unclear whether or not this is accounted for in the tiered process outlined in the immediately following paragraph. Also, this reviewer can't tell from the narrative whether or not in the tiered system, EPCs from Tier 1 are carried through to Tiers 2 and 3 or if new EPCs are developed based upon the more narrow range of original data specific to those stream systems. Please clarify.

21) **Page 25, Section 4.6:** The intake discussion should describe whether any bioavailability factors were applied to the incidental soil ingestion component. For most COPCs, this factor should be 100% (or 1.0) unless site-specific data are obtained, however EPA suggests using 60% (or 0.6) as an upper-end estimate of arsenic bioavailability in soils as a default. Information supporting this is available at (1) Section 5.10 at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/usersguide.htm and (2) http://epa.gov/superfund/bioavailability/pdfs/Transmittal%20Memo%20from%20Becki%20Clark%20to%20the%20Regions%2012-31-12.pdf

22) **Page 31, Section 3.2.1.2, Sediment:** The proposed revisions to the sediment screening values will need further discussion between Simplot and the Agencies. The previously-approved screening values were evaluated in the context of relatively widely-accepted values and sources and were also evaluated for consistency among other FS CERCLA phosphate mine sites. The current proposed values appear to have a more limited source application and would not be consistent with similar projects.

23) **Pages 31-35, Section 6.1:** It is unclear why the risk characterization for some receptors emphasizes that no ELCR was over 1E-05 (IDEQ's point of compliance) while others indicate none over 1E-04 (high point of EPA's risk range). Consistency is preferred with the 1E-05 likely being the most appropriate for this section. In addition, since risk thresholds are based on 1 significant figure, most agencies prefer site risk results to also be presented using 1 significant figure. Please revise accordingly.

24) **Page 38, Section 6.2.1, 2nd paragraph:** Report should indicate that the ELCR for the seasonal rancher is above the IDEQ limit of 1E-05.

25) **Page 43, Section 6.3.5:** It is stated that boron, molybdenum and silver did not have SLVs for surface water and ground water, and were screened because they did not exceed SLVs for soil and sediment. These chemicals have toxicity values, and should have been evaluated quantitatively in the risk assessment. Please revise accordingly.

26) **Table 3-2:**

a) The units shown for the source material/soil radionuclide screening levels are pCi/L. The units should be pCi/g. Please correct.
b) Groundwater screening levels appear to be the lower of the IDEQ Risk-Based Levels or the MCLs, however the MCL for uranium was not included and needs to be added.

27) **Table 4-1:**

a) The standard default exposure factors have recently been updated (EPA, 2014). For example, the adult resident water drinking rate is now 2.5 L/day, and the recommended adult body weight has changed from 70 kg to 80 kg. Please incorporate revised EPA standard default exposure factors.

b) RME exposures are intended to express a reasonable maximum exposure and its associated risk. A RME exposure frequency of 6 days per year for the hunting scenario would not be a reasonable maximum for future site use. Other mines (e.g., Ballard Mine) in the SE Idaho phosphate patch have used 14 days, which is more reasonable for a maximum exposure. This is supported by the interviews conducted for the Smoky Mountain Mine investigation (summary provided in Appendix A) where hunters indicated they hunt on site from 1 to 20 days/year.

c) A RME exposure frequency of 180 days per year for the hypothetical resident is low and inconsistent with exposures used at other phosphate mines. The RME should be at least 270 days per year, which would be consistent with the frequency used at the Ballard Mine and with the residential exposure frequency for direct contact pathways in the Idaho Risk Evaluation Manual (IDEQ, 2004).

Editorial Comments

28) Page 2, Section 1.1, 1st paragraph, 3rd sentence: Change COIs to COCs.

References

ATSDR, 2006. Health Consultation. Evaluation of selenium in elk in the Southeast Idaho Phosphate Resource Area, Bannock, Bear Lake, Bingham, Caribou Counties, Idaho. August 14, 2006. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Division of Health Assessment and Consultation, Atlanta, Georgia.

EPA, 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. Memorandum from Dana Stalcup to Superfund National Policy Managers, Regions 1-10. OSWER Directive 9200.1-120. Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington D.C. February 6, 2014.